

Orbital Speed Formula

Orbital Speed

The orbital speed of the object is the speed at which it orbits around the barycenter of a system which is usually around a massive body. Around the sun orbital speed of the earth is 108,000 km/h. The term can be used to refer to either the mean orbital speed, i.e. the average speed over an entire orbit, or its instantaneous speed at a particular point in its orbit.

The orbital speed formula is provided by,

$$v_{orbit} = \sqrt{\frac{GM}{R}}$$

Where,

G = gravitational constant

M = mass of the planet

r = radius.

Solved Example

Example 1

The mass of an object is given as 8.35×10^{22} Kg and the radius is given as 2.7×10^6 m. Find the orbital speed.

Solution:

Given:

$$M = 8.35 \times 10^{22} \text{ kg}$$

$$R = 2.7 \times 10^6 \text{ m}$$

$$G = 6.673 \times 10^{-11} \text{ m}^3/\text{kg s}^2$$

Orbital speed equation is given by,

$$v_{orbit} = \sqrt{GM / R}$$

$$v_{orbit} = \sqrt{6.673 \times 10^{-11} \times 8.35 \times 10^{22} / 2.7 \times 10^6}$$

$$v_{orbit} = 20.636 \times 10^6 \text{ m/s.}$$